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~~occasion to perform several successive coating phases. Thus, a single material distribution area is defined, rather than two zones (openings 7, 8) depicted in the case of Fig. 1.~~

Please amend the above-identified application prior to calculating the claim fees as follows:

In the claims:

Delete claims 1-19 and insert new claims 20-54.

20. A method for applying a uniform layer of a viscous material in a layerwise fashion in a rapid prototyping apparatus, the method comprising the steps of:

providing a working field for forming layers of the material;

supplying a volume of the material adjacent the working field; and

applying at least a portion of the volume of material over the working field to form the uniform layer utilizing at least one recoater blade and at least one rotating roller, the recoater blade and roller being driven in a coating direction when applying the material, the rotating roller contacting the volume of material and establishing a log of material circulating along a looping path about the rotating roller, the recoater blade being downstream from the roller when driven in the coating direction, the recoater blade being in communication with the log of material to channel the material circulating along the looping path when the recoater blade and roller are driven across the working field in the coating direction.

21. The method of claim 20 wherein the recoater blade further comprises a pusher having a proximal edge and when applying at least a portion of the material over the working field the proximal edge of the pusher coincides with the surface of the working field while maintaining contact with the log of material circulating along the looping path.

22. The method of claim 20 wherein when applying at least a portion of the material over the working field the log of material circulating along the looping path has a proximal portion adjacent the working field, and the material moving through the proximal portion of the log of material travels in a direction opposite the coating direction.

23. The method of claim 22 wherein when applying at least a portion of the material over the working field the roller is driven at a speed causing the material moving through the proximal portion of the log of material to travel at a relative speed with respect to the working field of about zero.

24. The method of claim 20 wherein the step of supplying a volume of the material adjacent the working field further comprises feeding the volume of material through an opening to protrude above and adjacent to the working field, the roller contacting the protruding material to establish the log of material prior to the step of applying at least a portion of the material over the working field.

25. The method of claim 20 wherein the viscous material has a viscosity of greater than about 10,000 centipoise.

26. The method of claim 20 wherein the viscous material does not flow when a shear stress of less than about 20 N/m^2 is applied.

27. The method of claim 20 wherein the step of applying the volume of material comprises using at least two rollers, the log of material circulating along the looping path about both rollers.

28. The method of claim 20 further comprising the step of:

detaching the log of material from the roller and recoater blade after the roller and recoater blade have been driven across the working field in the coating direction.

29. The method of claim 28 wherein the step of applying the volume of material over the working field is repeated in a second coating direction, the step of applying the material being performed with at least two recoater blades and at least two rollers, at least one recoater blade and at least one roller for applying the material when driven in the first coating direction, and at least one recoater blade and at least one roller for applying the material when driven in the second coating direction.

30. The method of claim 29 wherein the step of applying the volume of material over the working field is repeated in the first and the second coating directions until the uniform layer has been established.

31. The method of claim 30 further comprising the step of:

transforming the uniform layer of material to form a layer of a three-dimensional object.

32. The method of claim 31 wherein the steps are repeated until all the layers of the three-dimensional object are formed.

33. A system for applying a uniform layer of a viscous material in a layerwise fashion in a rapid prototyping apparatus, the system comprising:

a means for providing a working field for forming layers of the material;

a means for supplying a volume of the material adjacent the working field;

a means for applying at least a portion of the volume of material over the working field to form the uniform layer, the means for applying the material comprising at least one recoater blade and at least one rotating roller to form the uniform layer when the recoater blade and roller are driven in a coating direction;

a drive mechanism for moving the recoater blade and roller in the coating direction; and

a means for rotating the roller, the roller contacting the volume of material and establishing a log of material circulating along a looping path about the rotating roller, the recoater blade being downstream from the roller when driven in the coating direction, the recoater blade being in

communication with the log of material to channel the material circulating along the looping path when the recoater blade and roller are driven across the working field in the coating direction.

34. The system of claim 33 wherein the recoater blade further comprises a pusher having a proximal edge coinciding with the surface of the working field while maintaining contact with the log of material circulating along the looping path when applying at least a portion of the volume of material over the working field.

35. The system of claim 33 wherein the log of material circulating along the looping path has a proximal portion adjacent the working field, and the means for rotating the roller causes the material moving through the proximal portion of the log of material to travel in a direction opposite the coating direction.

36. The system of claim 35 wherein the means for rotating the roller drives the roller at a speed causing the material moving through the proximal portion of the log of material to travel at a relative speed with respect to the working field of about zero.

37. The system of claim 33 wherein the means for supplying the volume of material comprises at least one opening in which the material is fed through to protrude above and adjacent to the working field, the roller contacting the protruding volume of material to establish the log of material prior to being driven in the coating direction.

38. The system of claim 33 wherein the viscous material has a viscosity of greater than about 10,000 centipoise.

39. The system of claim 33 wherein the viscous material does not flow when a shear stress of less than about 20 N/m^2 is applied.

40. The system of claim 33 wherein the means for applying the volume of material further comprises at least two rollers, the log of material circulating along the looping path about both rollers.

41. The system of claim 33 further comprising a means for detaching the log of material from the roller and recoater blade after the roller and recoater blade have been driven past the working field in the coating direction.

42. The system of claim 33 wherein the means for applying the volume of material to form a uniform layer of material is driven in a first coating direction and a second coating direction, the means for applying the material further comprises at least two recoater blades and at least two rollers, at least one recoater blade and at least one roller for applying the material when driven in the first coating direction, and at least one recoater blade and at least one roller for applying the material when driven in the second coating direction.

43. The system of claim 42 further comprising a second means for supplying a volume of material adjacent the working field, the first means for supplying a volume of material in communication with the means for applying the material prior to moving the recoater blade and the roller in the first coating direction, and the second means for supplying a volume of material in communication with the means for applying the material prior to moving the recoater blade and the roller in the second coating direction.

44. The system of claim 43 further comprising:

a means for transforming the uniform layer of material to form a layer of a three-dimensional object prior to forming another uniform layer of material.

45. A rapid prototyping apparatus for forming a three-dimensional object from a viscous material in a plurality of layers, the apparatus comprising:

a means for providing a working field for forming layers of the material;

a means for supplying a volume of the material adjacent the working field;

a means for applying at least a portion of the volume of material over the working field to form a uniform layer of the material, the means for applying the material comprising at least one recoater blade and at least one rotating roller to form the uniform layer when the recoater blade and roller are driven across the working field in a coating direction;

a drive mechanism for moving the recoater blade and roller in the coating direction;

a means for rotating the roller, the roller contacting the volume of material and establishing a log of material circulating along a looping path about the rotating roller, the recoater blade being downstream from the roller when driven in the coating direction, the recoater blade being in communication with the log of material to channel the material circulating along the looping path when the recoater and roller are driven in the coating direction; and,

a means for transforming the uniform layer of material to form a layer of a three-dimensional object prior to forming another uniform layer of material.

46. The apparatus of claim 45 wherein the recoater blade further comprises a pusher having a proximal edge coinciding with the surface of the working field while maintaining contact with the log of material circulating along the looping path when applying at least a portion of the volume of material over the working field.

47. The apparatus of claim 45 wherein the log of material circulating along the looping path has a proximal portion adjacent the working field, and the means for rotating the roller causes the material moving through the proximal portion of the log of material to travel in a direction opposite the coating direction.

48. The apparatus of claim 47 wherein the means for rotating the roller drives the roller at a speed causing the material moving through the proximal portion of the log of material to travel at a relative speed with respect to the working field of about zero.

49. The apparatus of claim 45 wherein the drive mechanism moves the recoater blade and roller back and forth along a first coating direction and second coating direction, the uniform layer being formed by the means for applying the material when the recoater blade and the roller

travel in either the first coating direction or the second coating direction.

50. The apparatus of claim 49 further comprising:

a means for detaching the log of material from the roller and recoater blade after the roller and recoater blade have traveled past the working field in either the first coating direction or the second coating direction.

51. The apparatus of claim 50 wherein the means for applying the material further comprises at least two recoater blades and at least two rollers, at least one recoater blade and at least one roller for applying the material when driven in the first coating direction, and at least one recoater blade and at least one roller for applying the material when driven in the second coating direction.

52. The apparatus of claim 51 further comprising a second means for supplying a volume of material adjacent the working field, the first means for supplying a volume of material being in communication with the means for applying the material prior to moving the recoater blade and roller in the first coating direction, and the second means for supplying a volume of material being in communication with the means for applying the material prior to moving the recoater blade and roller in the second coating direction.

53. The apparatus of claim 52 wherein the recoater blade and roller for applying the material when driven in the first coating direction are inactive when the means for applying the material is driven in the second coating direction, and the recoater blade and roller for applying the material when driven in the second coating direction are inactive when the means for applying the material is driven in the first coating direction.

54. The apparatus of claim 53 wherein the first and second means for supplying a volume of material each have an opening in which the volume of material is delivered, the openings being on opposed ends of the working field.